CLAIMS

1. A conductive ink composition for deposition onto a substrate comprising a mixture of

(a) a metallo-organic decomposition compound;

(b) a metal powder; and

(c) a cure temperature lowering agent comprising a halogenated solvent.

2. The composition of claim 1, wherein the metal is silver.

3. The composition of claim 1, wherein the cure temperature lowering agent is tetrahydrofurfurylbromide.

4. The composition of claim 1, wherein the metal powder is present in an amount 1 to 20 times the amount of the metallo-organic decomposition compound by weight.

5. The composition of claim 1, wherein the cure temperature lowering agent is present in an amount of 0.5 to 20 weight % in the composition.

6. The composition of claim 1, wherein the metal powder has an average particle size of from about 0.05 to 15 μm.

7. A method for preparing an electrically conductive ink composition for deposition onto a substrate comprising mixing

(a) a metallo-organic decomposition compound;

(b) a metal powder; and

(c) a cure temperature lowering agent comprising a halogenated solvent

to form an electrically conductive ink composition.

8. The method of claim 7, wherein the metal powder is present in an amount 1 to 20 times the amount of the metallo-organic decomposition compound by weight.

9. The method of claim 7, wherein the cure temperature lowering agent is present in the amount of 0.5 to 20 % by weight.

10. The method of claim 7, further comprising roll milling the mixture to produce a homogeneous composition.

11. The method of claim 7, wherein the metal powder has an average particle size of from about 0.05 to 15 μm.

12. The method of claim 7, wherein the cure temperature lowering agent is tetrahydrofurfurylbromide.

13. The method of claim 7, wherein the metal is silver.

14. A method for preparing a solid pure metal conductor on a substrate comprising the steps of

(a) mixing a metallo-organic decomposition compound, a metal powder, and a cure temperature lowering agent comprising a halogenated solvent;

(b) applying the mixture formed in step (a) onto the substrate; and

(c) heating the substrate at a critical temperature less than 200°C for a time less than about 30 minutes;

wherein the applied mixture is converted into a well-consolidated pure metal conductor.

15. The method of claim 14, wherein the metal powder is present in an amount 1 to 20 times the amount of the metallo-organic decomposition compound by weight.

16. The method of claim 14, wherein the cure temperature lowering agent is tetrahydrofurfurylbromide.

17. The method of claim 14, wherein the cure temperature lowering agent is present in the amount of 0.5 to 10 % by weight;

18. The method of claim 14, further comprising roll milling the mixture to produce a homogeneous composition.

19. The method of claim 14, wherein the metal powder has an average particle size of from about 0.05 to 15 μm.

20. The method of claim 14, wherein the mixture is applied by printing.

21. The method of claim 20, wherein the printing technique is selected from screen printing, rotary screen printing, gravure printing, intaglio printing, flexographic printing, letterpress printing, lithographic printing, ink jet printing or electrostatic printing.

22. The method of claim 14, wherein the metal is silver.

23. The method of claim 14, wherein the temperature is between 120°C and 150°C.

24. A conductive ink composition for deposition onto a substrate comprising a mixture of

(a) a reactive organic medium comprising organic coated metallic nanoparticles; and

(b) a cure temperature lowering agent.

25. The composition of claim 24, wherein the metal is silver.

26. The composition of claim 24, wherein the cure temperature lowering agent is a polymer selected from polyvinylidene chloride, polyvinyl chloride, polyethylene vinyl chloride, or copolymers thereof.

27. The composition of claim 24, wherein the nanoparticles are present in the amount of 10 to 80 % by weight.

28. The composition of claim 24, wherein the cure temperature lowering agent is present in an amount of 0.5 to 8 weight % in the composition.

29. The composition of claim 24, wherein the nanoparticles have an average particle size of from 40 to 100 nm.

30. The composition of claim 24, further comprising an organic liquid vehicle.

31. The composition of claim 30, wherein the organic liquid vehicle is present in an amount of from 5 to 80% by weight.

32. The composition of claim 24, further comprising a metal flake.

33. The composition of claim 32, wherein the metal flake is present in an amount of from 10 to 60 % by weight.

34. The composition of claim 32, wherein the metal flake has an average particle size of from 3 to 12 μm.

35. A method for preparing an electrically conductive ink composition for deposition onto a substrate comprising mixing

(a) a reactive organic medium comprising organic coated metallic nanoparticles; and;

(b) a cure temperature lowering agent

to form an electrically conductive ink composition.

36. The method of claim 35, further comprising roll milling the mixture to produce a homogeneous composition.

37. The method of claim 35, wherein the metal is silver.

38. The method of claim 35, wherein the nanoparticles are present in the amount of from 10 to 80 % by weight.

39. The method of claim 35, wherein the cure temperature lowering agent is a polymer selected from polyvinylidene chloride, polyvinyl chloride, polyethylene vinyl chloride, or copolymers thereof.

40. The method of claim 35, wherein the cure temperature lowering agent is present in an amount of from 0.5 to 8 weight % in the composition.

41. The method of claim 35, wherein the nanoparticles have an average particle size of from 40 to 100 μm.

42. The method of claim 35, further comprising an organic liquid vehicle.

43. The method of claim 42, wherein the organic liquid vehicle is present in an amount of from 5 to 80% by weight.

44. The method of claim 35, further comprising mixing a metal flake with the reactive organic medium and the cure temperature lowering agent.

45. The method of claim 44, wherein the metal flake is present in an amount of from 10 to 60% by weight.

46. The method of claim 44, wherein the metal flake has an average particle size of from 3 to 12 μm.

47. The method of claim 44, wherein the metal is silver.

48. A method for preparing a solid pure metal conductor on a substrate comprising the steps of

(a) mixing a reactive organic medium comprising organic coated metallic nanoparticles, a metal powder, and a cure temperature lowering agent;

(b) applying the mixture formed in step (a) onto the substrate; and

(c) heating the substrate at a critical temperature less than 200°C for a time less than about 30 minutes;

wherein the applied mixture is converted into a well-consolidated pure metal conductor.

49. The method of claim 48, wherein the metal is silver.

50. The method of claim 48, further comprising roll milling the mixture to produce a homogeneous composition.

51. The method of claim 48, wherein the metal nanoparticles are present in an amount of from 10 to 80% by weight.

52. The method of claim 48, wherein the cure temperature lowering agent is present in an amount of from 0.5 to 8% by weight.

53. The method of claim 48, wherein the nanoparticles have an average size of from 40 to 100 nm.

54. The method of claim 48, further comprising mixing a metal flake with the reactive organic medium and the cure temperature lowering agent.

55. The method of claim 54, wherein the metal flake is silver.

56. The method of claim 54, wherein the metal flake is present in an amount of from 10 to 60% by weight.

57. The method of claim 54, wherein the metal flake has an average particle size of from 3 to 12 μm.

58. The method of claim 48, wherein the mixture is applied by printing.

59. The method of claim 58, wherein the printing technique is selected from screen printing, rotary screen printing, gravure printing, intaglio printing, flexographic printing, letterpress printing, lithographic printing, ink jet printing or electrostatic printing.

60. The method of claim 48, wherein the temperature is between 120°C and 150°C.

61. The method of claim 48, wherein the cure temperature lowering agent is a polymer selected from polyvinylidene chloride, polyvinyl chloride, polyethylene vinyl chloride, or copolymers thereof.

62. The method of claim 48, wherein the substrate is selected from polyester, polyimide, epoxy or paper.